

IN THE UNITED STATES PATENT AND TRADEMARK OFFICE

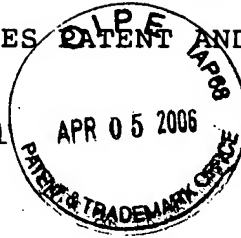
In re application of

Dharapuram N. Srinath et al

Serial No. 10/016,131

Filed: December 17, 2001

For: METHOD AND APPARATUS FOR GENERATION OF LOW IMPACT SPRAYS



Group Art Unit 3752

Christopher S. Kim

SECOND AMENDED APPEAL BRIEF TRANSMITTAL

Commissioner for Patents
P.O. Box 1450
Alexandria, VA 22313-1450

Sir:

Attached hereto are three (3) copies of the SECOND AMENDED BRIEF ON APPEAL for the above-identified application. This is being filed in response to the Notification of Non-Compliant Appeal Brief mailed March 23, 2006. The payment of the brief in the amount of \$250.00 was paid with the filing of the original BRIEF ON APPEAL on June 28, 2005.

Any additional fees necessary to effect the proper and timely filing of this Brief may be charged to Deposit Account No. 26-0090.

Respectfully submitted,

A handwritten signature in black ink that reads "Jim Zegeer".

Jim Zegeer, Reg. No. 18,957
Attorney for Appellants

Attachments: Second Amended Brief on Appeal (3 copies)
Amendment

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801 North Pitt Street
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Date: April 5, 2006

In the event this paper is deemed not timely filed, the applicant hereby petitions for an appropriate extension of time. The fee for this extension may be charged to Deposit Account No. 26-0090 along with any other additional fees which may be required with respect to this paper.



Atty. Docket No.: 3135-Z

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Serial No. 10/016,131
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For: METHOD AND APPARATUS FOR GENERATION OF LOW IMPACT SPRAYS

Group Art Unit 3752
Christopher S. Kim

SECOND AMENDED BRIEF ON APPEAL

Commissioner for Patents
P.O. Box 1450
Alexandria, VA 22313-1450

Sir:

This is an appeal from the final rejection mailed December 29, 2004 of Claims 1, 2, 4, 6, 7 and 11 of the above-identified application. Claims 12 and 13 have been cancelled by an amendment being filed concurrently herewith.

I. The Real Party in Interest

The real party in interest is Bowles Fluidics Corporation.

II. Related Appeals and Interferences

There are no related appeals or interferences.

III. Status of the Claims

Claims 1, 2, 4, 6, 6, 7 and 11. All other claims have been cancelled.

IV. Status of the Amendments

An amendment was filed after the final rejection but did not result in allowance of the application.

V. Summary of Claimed Subject Matter

The invention is directed to a device for producing a spray of liquid droplets which project with a momentum such that the liquid droplets do not bounce off of a selected surface. All of the fluidic oscillators utilized are conventional in the sense that they are disclosed in the prior art. What is novel is the combination of a fluidic oscillator connected to a liquid source by a non-restrictive pressure reducer and wherein the spray droplets issuing from the fluidic spray nozzle have reduced velocity so that the spray droplets do not bounce off of the surface which is being cleaned.

Figures 1, 3, 5, 7 and 8 are produced on the following page for convenience of reference:

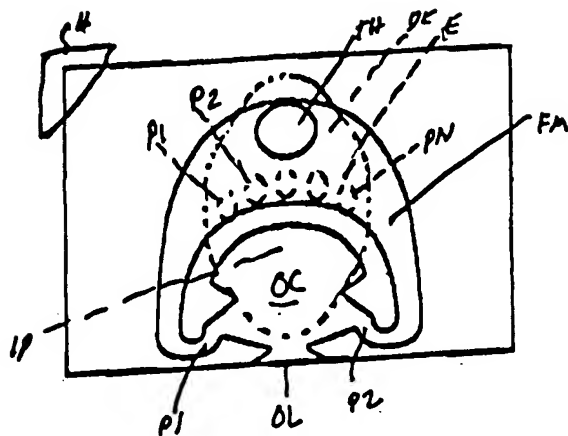


FIGURE 1

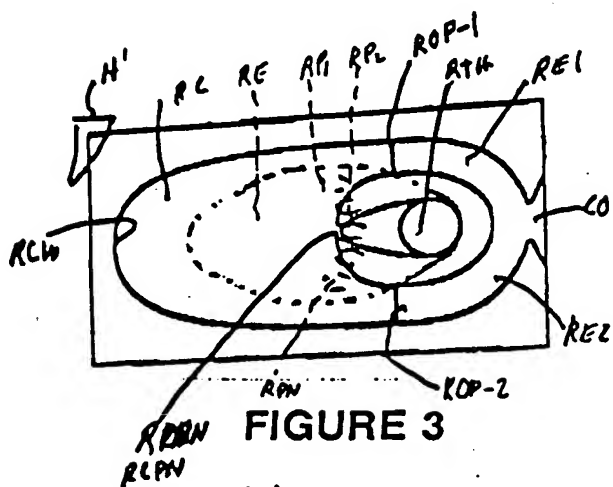


FIGURE 3

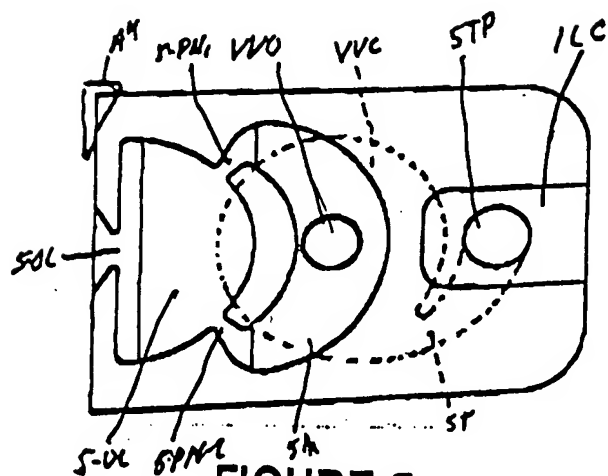


FIGURE 5

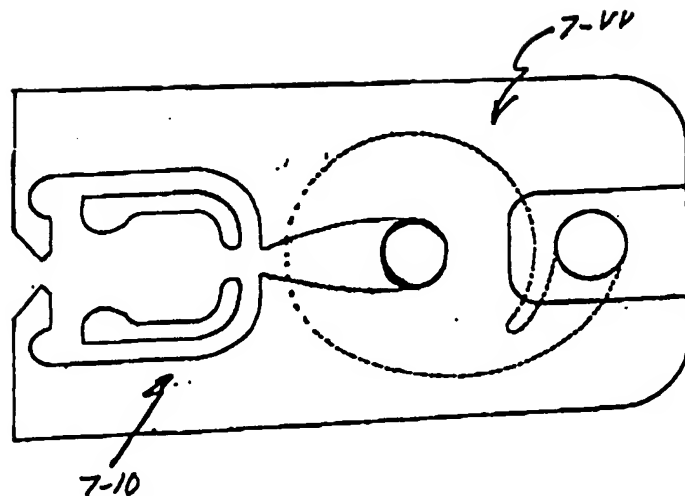


FIGURE 7

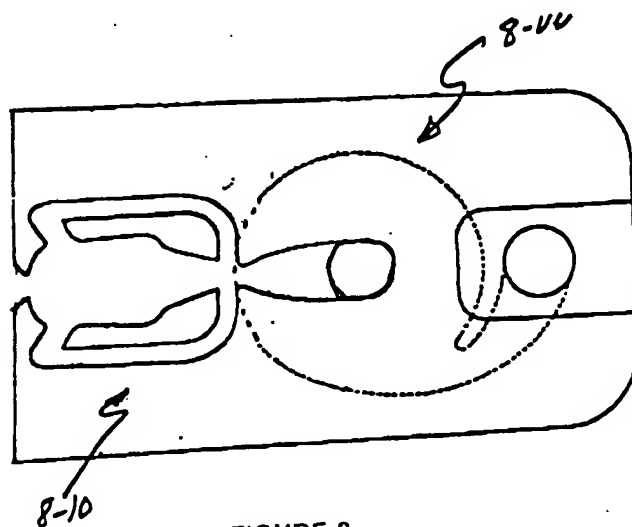


FIGURE 8

In one embodiment (Figure 1), the fluidic oscillator is the type disclosed in Raghu Patent No. 6,253,782 which is combined with a bi-level filter shown in Srinath Patent No. 6,186,409. In another embodiment (Figure 3), the bi-level filter is combined with a reversing chamber oscillator as shown in Srinath et al Patent No. 6,186,409. In still another embodiment of the invention (Figure 5), a vortex valve is placed in advance of an inlet flow of the power nozzle fluidic oscillator of the type shown in Raghu's patent. In yet another embodiment of the invention (Figure 7), a conventional fluidic oscillator with control passages of the type disclosed in Stouffer Patent No. 4,508,267 is coupled with an upstream vortex valve, or a conventional prior art oscillator as shown in Bray Patent No. 4,463,904 (Figure 8) is combined with the upstream vortex valve pressure reducer.

The following claim annotation is a concise explanation of the subject matter defined in each of the independent and dependent claims involved in the appeal referring to the specification by page and line number, the drawings and the reference characters and identifies each independent claim involved in the appeal and every means plus function under 35 U.S.C. 112, sixth paragraph, and sets forth the structure and material or acts described in the specification as corresponding to each claim function and with reference to the specification by page and line number and to the drawings by reference characters. Note in particular the references in claims 7 and 11 which identify the means plus

function clauses in these claims and which is in full compliance with paragraph 7 of the final action mailed December 29, 2004:

1. A fluidic spray system for producing a spray of liquid droplets projected with a momentum such that said liquid droplets do not bounce off of a selected surface, comprising in combination, a fluidic oscillator (Figures 5, 7 and 8) coupled to a supply of liquid under pressure and a vortex valve (Figures 5, 7 and 8: VVC, 7-VV and 8VV, respectively, page 11, paragraph 2; page 12, paragraph 2) immediately upstream of said fluidic oscillator .

2. A fluidic spray system for producing a liquid spray in which the spray droplets have a momentum which allows spray droplets to be delivered to a selected surface area without said spray droplets bouncing off of said selected surface, comprising, a fluidic oscillator connected to a source of liquid under pressure and wherein said fluidic oscillator is selected from:

- a multiple power nozzle oscillator (Figure 1: page 9, paragraphs 1 and 2),
- a reversing chamber oscillator (Figure 3: page 10, paragraph 1, lines 6-7), and
- a feedback oscillator (Figures 7 and 8: page 12, lines 3-11),

and

a non-restrictor pressure reducer upstream of said fluidic oscillator (flow reverser TH and RTH in Figures 1 and 2: page 9, paragraph 1, line 10; vortex valve in Figures 5, 7 and 8: page 11, paragraph 1; page 12, lines 3-11).

4. The fluidic spray system defined in claim 2 wherein said non-restrictor pressure reducer is a vortex valve (Figure 5: VVC, page 11, line 4 et seq, Figure 7: 7-VV, Figure 8: 8-VV, page 12, paragraph 1).

6. A fluidic spray system for producing a liquid spray in which the spray droplets have a momentum such that said spray droplets do not bounce on impacting a surface and allows substantially unrestricted flows to be delivered to a point of utilization on said surface comprising a fluidic oscillator (Figure 5, Figure 7: 7-10, Figure 8: 8-10) having an input coupled to a supply of liquid under pressure and a vortex valve (Figure 5: VVC, Figure 7: 7-VV, Figure 8: 8-VV) immediately upstream of said fluidic oscillator, said vortex valve having an output which is connected to the input of said fluidic oscillator (page 11, paragraph 1, lines 3-27; page 12, lines 1-23).

7. A fluidic oscillator spray system comprising a fluidic oscillator (Figures 1 and 5: multiple power nozzle type; Figure 7: 7-10, Figure 8: 8-10) and non-restrictor pressure reducing means (Figures 1 and 2: TH and RTH; Figure 7: 7-VV, Figure 8: 8-VV; coupling said oscillator to a source of liquid for producing a liquid spray in which the spray droplets have a momentum and allows for producing droplets of larger diameters and a selected range of diameters for similar operating pressures (page 9, line 16 et seq; page 12, lines 3-10).

11. A device for producing spray droplets which are adapted to adhere to a surface comprising, a fluidic spray nozzle (Figures 1, 3, 5, 7 and 8, the full line spray nozzle silhouettes) connectable to a source of liquid under pressure, means (Figures 1 and 3: flow reverser, TH and RTH; page 9, line 11, vortex valve, Figure 5: VVC, Figure 7, 7-VV, Figure 8: 8-VV, page 12, lines 1-23) for reducing the velocity of spray droplets issuing from said fluidic spray nozzle so that said spray droplets have energy such that they do not bounce off said surface.

The advantages of the invention are as follows:

- (1) Large flow channels decrease the possibility of clogging, compared to restrictors.
- (2) Including a filter as illustrated in the reversing chamber circuit as an example will allow the nozzle to remain functional even if there are particulates in the flow.
- (3) The invention allows for adequate flow rates for the intended purpose, such as rear window washing in cars, under low temperature environments.
- (4) Controlled distribution of the liquid allows for delivering the liquid to the desired area without overspray or bouncing off the surface.
- (5) The invention allows wide spray angles to be designed to cover large areas, without bouncing off the surface.

VI. Grounds of Rejection to be Reviewed on Appeal

Ground No. 1

Claims 2 and 4 were rejected under 35 U.S.C. §112, first paragraph, as failing to comply with the written description request.

Ground No. 2

Claims 11 - 13 were rejected under 35 U.S.C. §112, second paragraph, as being indefinite for failing to particularly point out and distinctly claim the subject matter which applicant regards as the invention.

Ground No. 3

Claims 1, 6, 7, 11 and 12 were rejected under 35 U.S.C. §102(b) as being anticipated by Babich et al (US 4,205,786) (hereinafter "Babich").

Ground No. 4

Claims 1, 2, 4, 6, 7 and 11 - 13 were rejected under 35 U.S.C. §102(b) as being anticipated by Nekrasov et al (US 3,614,961).

Ground No. 5

Claim 2 was rejected under 35 U.S.C. §102(e) as being anticipated by Raghu (US 6,253,782).

VII. Argument

As to Ground No. 1, the rejection of claims 2 and 4 under 35 U.S.C. §112, first paragraph, is clearly in error. The Examiner contends that: "The disclosure as originally filed fails to disclose the fluidic oscillator as being a non-restrictor pressure reducer upstream of itself," and this is so: The non-restrictor pressure reducer is upstream of the fluidic oscillator. The Examiner has misinterpreted the language. Claim 2 recites a fluidic oscillator connected to a source of liquid under pressure and wherein the fluidic oscillator is from a group of three fluidic oscillators:

"a multiple power nozzle oscillator,
a reversing chamber oscillator, and
a feedback oscillator...."

The claim then recites "and a non-restrictor pressure reducer upstream of said fluidic oscillator." With the word "and" interposed after the recitation of the third type of fluidic oscillator, it is a further element and not a part of the listed selection of fluidic oscillator types.

As to Ground No. 2, the objection to claims 11 - 13 under 35 U.S.C. §112, second paragraph, has been obviated by the cancellation of claims 12 and 13. In addition, claim 11, with the structure encompassed by the "means plus function" clause, reads as follows:

11. A device for producing spray droplets which are adapted to adhere to a surface comprising, a fluidic spray nozzle (Figures 1, 3, 5, 7 and 8, the full line spray nozzle silhouettes) connectable to a source of liquid under pressure, means (Figures 1 and 3: flow

reverser, TH and RTH; page 9, line 11, vortex valve, Figure 5: VVC, Figure 7, 7-VV, Figure 8: 8-VV, page 12, lines 1-23) for reducing the velocity of spray droplets issuing from said fluidic spray nozzle so that said spray droplets have energy such that they do not bounce off said surface.

As to Ground No. 3, the rejection of claims 1, 6, 7, 11 and 12 under 35 U.S.C. §102(b) as being anticipated by Babich is in error.

Initially, it will be noted that this Babich patent (Figs. 1 and 2 of Babich are reproduced on the following page for convenience of reference) relates to: "heat-power engineering and has particular reference to atomizing device...." (Col. 1, lines 1-2). The present invention, on the other hand, is directed to a device for producing a spray of liquid droplets which project with a momentum such that the liquid droplets do not bounce off of a selected surface. Clearly, the Babich reference is not analogous art; it does not deal with liquid droplets that do not bounce off of a selected surface. See claims 1 and 2. Moreover, claim 1 recites a fluidic oscillator coupled to a supply of liquid under pressure and a vortex valve immediately upstream of said fluidic oscillator. This is not the case with Babich. In Babich, the swirl chamber 1 is provided with a nozzle and a pipe 4 running coaxially through the swivel chamber 1 and a nozzle into the zone of material atomization. The material to be atomized is fed through passage in channel A into pipe 4 and to outlet apertures 21. The second chamber 10 is an ultrasonic wave resonator. Obviously, the swirl chamber 1 is not used as a vortex valve, and it is not upstream of a fluidic oscillator. In Babich, the swirl

United States Patent 4,205,786
Babich et al.

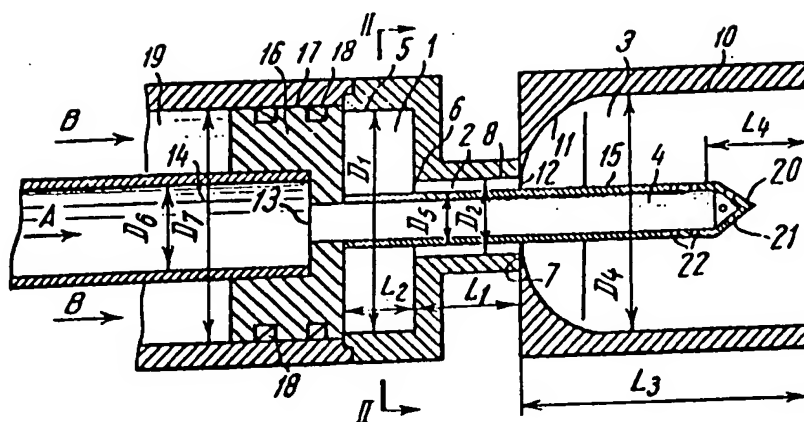
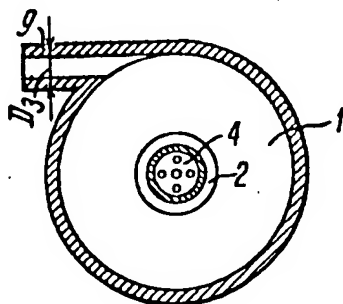


FIG. 1



chamber 1 is adapted to rotate the flow of an "atomizing gas."
There is no fluidic oscillator coupled to a supply of liquid under pressure and a vortex valve immediately upstream of the fluidic oscillator.

A gas is not a liquid, and it does not form droplets. The droplets are formed by the atomization of the material fed through passage A.

In regard to claim 6, the Babich reference has no fluidic oscillator having an input coupled to a supply of liquid under pressure and a vortex valve immediately upstream of the fluidic oscillator, said vortex valve having an output which is connected to the input of the fluidic oscillator as recited in claim 6.

Claim 7 calls for an oscillator coupled to a source of liquid for producing a liquid spray in which the spray droplets have a momentum and allows for producing droplets of larger diameters and a selected range of diameters for similar operating pressures which is not disclosed in the reference.

Claim 11 recites a device for producing droplets which adhere to a surface comprising "...means for reducing the velocity of spray droplets issuing from said fluidic spray nozzle so that said spray droplets have energy such that they do not bounce off said surface." There is no teaching or suggestion of this function and result in the Babich reference. It is not inherent therein.

In Babich and Nekrasov, liquid (fuel) to be atomized is fed into an ultrasonic oscillator wave field to break up the liquid into small droplets. In contrast, fluidic oscillators of the type

specified in claim 2, for example, wave a liquid jet back and forth in ambient air to cause the jet of liquid to form the low momentum droplets.

Claims 12 and 13 have been cancelled.

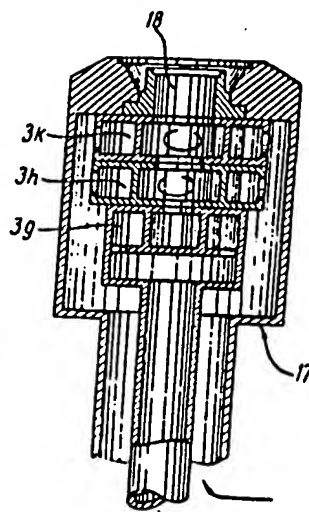
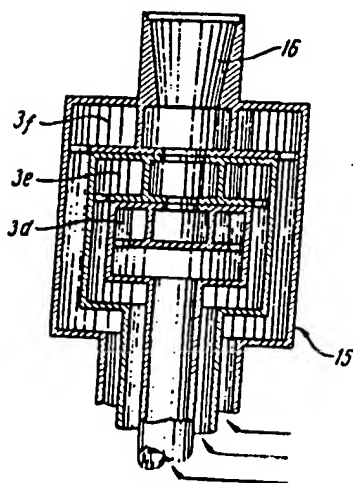
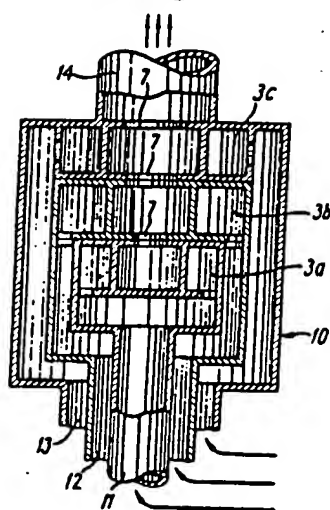
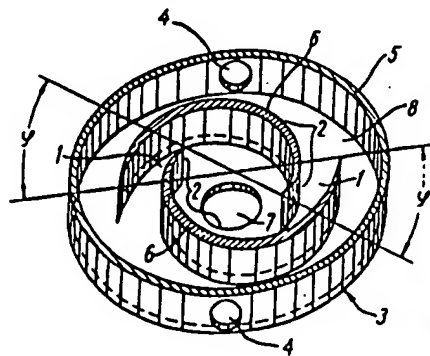
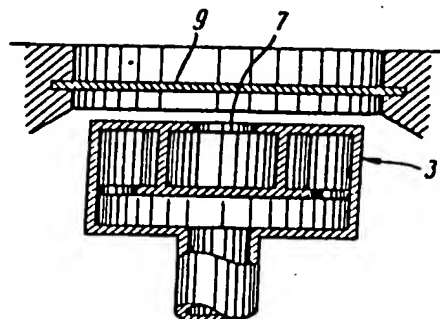
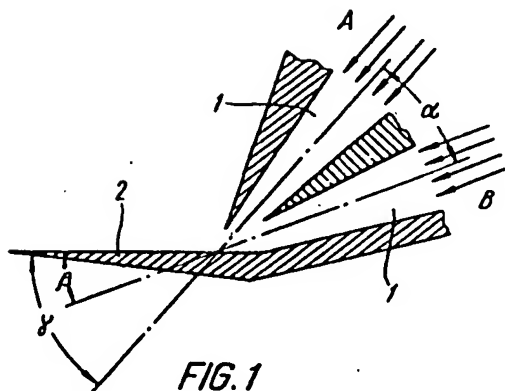
As to Ground No. 4, the rejection of claims 1, 2, 4, 6, 7 and 11 - 13 under 35 U.S.C. §102(b) as being anticipated by Nekrasov is clearly in error. The Examiner's rejection reads as follows:

Nekrasov discloses a fluidic spray system comprising a fluidic oscillator 2, 7 coupled to a supply of liquid A, B and a vortex valve 1.

As discussed above, Nekrasov (A xerographic collage of Figs. 1-6 of Nekrasov is reproduced on the following page for convenience of reference) is directed to an ultrasonic generator, its title reading: "Method of Generating Vibrations in the Sonic and Ultra-Sonic Frequency Ranges and Devices for Carrying Said Method into Effect."

N. NEKRASOV ET AL

3,614,961



In the preamble to Nekrasov's specification, Nekrasov states:

This invention relates to ultrasonic vibration generators, and to a method of generating sonic and ultrasonic oscillations as well as to devices for carrying out this method.

This is hardly in applicant's field and is clearly not analogous art.

Moreover, the claims are not anticipated or made obvious by this reference.

Claim 1 recites a "fluidic oscillator coupled to a supply of liquid under pressure and a vortex valve immediately upstream of said fluidic oscillator." Nekrasov does not seek to provide liquid droplets projected with momentum such that they do not bounce off of a selected surface.

Nekrasov states:

It is common knowledge that a droplet size, either for liquid or for mixture of liquids dispersed with the aid of some gas or stream, depends upon the amplitude and frequency of vibrations imparted to a dispersed liquid and to a liquid and to a dispersing gas.
(Col. 4, lines 37 et seq.)

They state that the test ultrasonic fuel burner made according to their invention provides the dispersion of fuel to droplets less than 15 microns in size under a pressure of 4 to 6 atm. gauge for the fuel and of 4 to 4 atm. gauge for the dispersing agent (air or steam).

The present applicants do not seek to atomize as does Nekrasov and Babich.

While Nekrasov's resonators may be termed "fluid effect" devices, they are not fluidic spray systems and do not produce low

momentum liquid droplets projected with a momentum such that they do not bounce off of a selected surface. They do not appear to be coupled to a liquid supply in the manner defined by the claims, and there is no vortex valve immediately upstream and the fluid upstream of the fluidic oscillator. Claim 2 calls for a fluidic spray system for producing a liquid spray in which the spray droplets have a momentum which allows them to be delivered to a selected surface area without bouncing off and also calls for a multiple power nozzle fluidic oscillator, a reversing chamber oscillator, a feedback oscillator (all of which cause droplet formation by sweeping a liquid jet back and forth in the ambient) and a non-restrictor pressure reducer upstream of the fluidic oscillator. There is no such construction or teaching of this in the reference. An ultrasonic whistle is not a vortex valve upstream of a fluidic oscillator (claims 2 and 6), and an ultrasonic whistle and a supply of liquid for atomization is not a "non-restrictor pressure reducing means coupling a fluidic oscillator to a source of liquid (claims 7 and 11) .

As to Ground No. 5, the rejection of claim 2 under 35 U.S.C. §102(e) is in error because Raghu (US 6,253,782) is not prior art. See 35 U.S.C. §103(c). This application and Patent No.6,253,782 were copending and are owned by the same entity.

Moreover, the rejection of claim 2 under 35 U.S.C. §102(e) as being anticipated by Raghu (a coinventor of the present application) is erroneous. The claim recites:

A fluidic spray system for producing a liquid spray in which the spray droplets have a momentum which allows spray droplets to be delivered to a selected surface area without said spray droplets bouncing off of said selected surface, comprising, a fluidic oscillator connected to a source of liquid under pressure and wherein said fluidic oscillator is selected from:....

Three broad categories of fluidic oscillators are listed:

a "multiple power nozzle" type fluidic oscillator, along with two other types of fluidic oscillators,
and "a non-restrictor pressure reducer upstream of said fluidic oscillator."

Raghu discloses a multiple power nozzle type fluidic oscillator but does not disclose a spray system having an upstream non-restrictor pressure reducer.

CONCLUSION

In conclusion, the Examiner has erred in finally rejecting claims 1, 2, 4, 6, 7 and 11 and should be reversed.

Respectfully submitted,



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Attorney for Appellants

Attachment: VIII. CLAIMS APPENDIX

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Date: April 4, 2006

In the event this paper is deemed not timely filed, the applicant hereby petitions for an appropriate extension of time. The fee for this extension may be charged to Deposit Account No. 26-0090 along with any other additional fees which may be required with respect to this paper.



VIII. CLAIMS APPENDIX

1. A fluidic spray system for producing a spray of liquid droplets projected with a momentum such that said liquid droplets do not bounce off of a selected surface, comprising in combination, a fluidic oscillator coupled to a supply of liquid under pressure and a vortex valve immediately upstream of said fluidic oscillator.

2. A fluidic spray system for producing a liquid spray in which the spray droplets have a momentum which allows spray droplets to be delivered to a selected surface area without said spray droplets bouncing off of said selected surface, comprising, a fluidic oscillator connected to a source of liquid under pressure and wherein said fluidic oscillator is selected from:

- a multiple power nozzle oscillator,
- a reversing chamber oscillator, and
- a feedback oscillator, and

a non-restrictor pressure reducer upstream of said fluidic oscillator.

4. The fluidic spray system defined in claim 2 wherein said non-restrictor pressure reducer is a vortex valve.

6. A fluidic spray system for producing a liquid spray in which the spray droplets have a momentum such that said spray droplets do not bounce on impacting a surface and allows substantially unrestricted flows to be delivered to a point of utilization on said surface comprising a fluidic oscillator having an input coupled to a supply of liquid under pressure and a vortex valve immediately upstream of said fluidic oscillator, said vortex valve having an output which is connected to the input of said fluidic oscillator.

7. A fluidic oscillator spray system comprising a fluidic oscillator and non-restrictor pressure reducing means coupling said oscillator to a source of liquid for producing a liquid spray in which the spray droplets have a momentum and allows for producing droplets of larger diameters and a selected range of diameters for similar operating pressures.

11. A device for producing spray droplets which are adapted to adhere to a surface comprising, a fluidic spray nozzle connectable to a source of liquid under pressure, means for reducing the velocity of spray droplets issuing from said fluidic spray nozzle so that said spray droplets have energy such that they do not bounce off said surface.

IX. EVIDENCE APPENDIX

There is no additional evidence.

X. RELATED PROCEEDINGS APPENDIX

There are no related proceedings.